

## ABSTRACT OF THE DISCLOSURE

An object is to provide a method of activating impurity elements added to a semiconductor film, and a method of gettering, in a process of manufacturing a semiconductor device using a substrate having a low resistance to heat, such as glass,  
5 without changing the shape of the substrate, by using a short time heat treatment process. Another object is to provide a heat treatment apparatus that makes this type of heat treatment process possible. A unit for supplying a gas from the upstream side of a reaction chamber, a unit for heating the gas in the upstream side of the reaction chamber, a unit for holding a substrate to be processed in the downstream side of the  
10 reaction chamber, and a unit for circulating the gas from the downstream side of the reaction chamber to the upstream side are prepared. The amount of electric power used in heating the gas can be economized by circulating the gas used to heat the substrate to be processed. A portion of the circulating gas may be expelled, and can be utilized as a heat source in order to preheat a newly introduced gas.

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